

84.83 - Transmission shafts (including cam shafts and crank shafts) and cranks; bearing housings and plain shaft bearings; gears and gearing; ball or roller screws; gear boxes and other speed changers, including torque converters; flywheels and pulleys, including pulley blocks; clutches and shaft couplings (including universal joints).

- 8483.10 - Transmission shafts (including cam shafts and crank shafts) and cranks
- 8483.20 - Bearing housings, incorporating ball or roller bearings
- 8483.30 - Bearing housings, not incorporating ball or roller bearings; plain shaft bearings
- 8483.40 - Gears and gearing, other than toothed wheels, chain sprockets and other transmission elements presented separately; ball or roller screws; gear boxes and other speed changers, including torque converters
- 8483.50 - Flywheels and pulleys, including pulley blocks
- 8483.60 - Clutches and shaft couplings (including universal joints)
- 8483.90 - Toothed wheels, chain sprockets and other transmission elements presented separately; parts.

The goods covered by this heading are mainly :

- (i) Certain mechanical parts which are used in the transmission of power from an **external** power unit to one or more machines.
- (ii) Certain **internal** parts of a machine, used to transmit power to the various parts of the same machine.

**(A) TRANSMISSION SHAFTS
(INCLUDING CAM SHAFTS AND CRANK SHAFTS)
AND CRANKS**

These usually transmit a rotary motive power. They include :

- (1) **Main shafts or driving shafts** driven directly by the motor.
- (2) **Counter shafts**, for coupling to the main shaft by belts and pulleys or by cogs, etc.; they are used to take the drive from the main shaft to a number of machines, or to different parts of a machine.
- (3) **Articulated shafts**, consisting of two or more shafts connected by ball and socket joints, etc.
- (4) **Flexible shafts** which transmit the motion of a driving unit to, e.g., hand tools, measuring instruments (revolution counters, speedometers, etc.).
- (5) **Cranks and crank shafts**. These may be either made in one piece or assembled from several parts. They receive a reciprocating motion (e.g., from a piston engine) and convert it into rotary movement, or vice versa.
- (6) **Cam shafts and eccentric shafts**.

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The heading **does not cover** simple axles which do not transmit power but merely support a wheel or other revolving part.

It also **excludes** :

- (a) Bars of iron or steel of uniform cross-section (**heading 72.14 or 72.15**).
- (b) Simple lengths of twisted wire for the manufacture of flexible drives, not fitted with coupling attachments (**heading 73.12**).
- (c) Oscillating connecting-rods for transmitting motion to cutter bars of lawn mowers or grass cutters (**heading 84.33**).

(B) BEARING HOUSINGS AND PLAIN SHAFT BEARINGS

Bearing housings consist of a frame or block designed to house the plain, ball, roller, etc., bearing in which (or, in the case of a thrust bearing, against which) the ends of a shaft or axle turn. They usually consist of two parts which, when fitted together, form a ring to hold the bearing. They may incorporate means of lubricating the bearing.

They also often incorporate a chair, plate, bracket, etc., by which they can be fixed to the machine, or to a wall or other part of a building; but chairs, plates, brackets, etc., not incorporating a bearing housing (nor themselves designed to house a bearing) **are classified according to the constituent material** (usually **heading 73.25 or 73.26**).

Bearing housings incorporating ball, roller or needle roller bearings remain classified in this heading; but ball, roller or needle roller bearings presented separately fall in **heading 84.82**.

On the other hand **plain shaft bearings** are classified in this heading even if they are presented without housings. They consist of rings of anti-friction metal or other material (e.g., sintered metal or plastics). They may be in one piece or in several pieces clamped together, and form a smooth bearing in which a shaft or axle turns.

The heading **does not include** graphite or other carbon bearings (**heading 68.15**).

(C) GEARS AND GEARING INCLUDING FRICTION GEARS AND CHAIN SPROCKETS

The **basic gear** is the toothed wheel, cylinder, cone, rack or worm, etc. In an assembly of such gears, the teeth of one engage with the teeth of another so that the rotary movement of the first is transmitted to the next, and so on. According to the relative number of teeth in the separate units, the rotary movement may be transmitted at the same rate, or at a faster or slower rate; according to the type of gear and the angle at which it meshes with the next, the direction of transmission may be changed, or a rotary movement converted into a linear movement or vice versa (as with a rack and pinion).

The group covers all types of gears including simple cog wheels, bevel gears, conical gears, helical gears, worms, rack and pinion gears, differential gears, etc., and assemblies of such gears. It also covers toothed and similar wheels for use with transmission chains.

The group also covers **friction gears**. These are wheels, discs or cylinders, which, when mounted one on the driving shaft and one on the driven shaft, transmit the movement by friction between them. They are usually of cast iron, in certain cases being covered with leather, wood, bonded fibres or other material to increase the friction.

(D) BALL OR ROLLER SCREWS

Ball or roller screws consist of a threaded shaft and a nut with bearing balls or rollers distributed along the path between the threads on its inner surface; these devices enable rotary motion to be converted into linear motion, and vice versa.

(E) GEAR BOXES AND OTHER SPEED CHANGERS, INCLUDING TORQUE CONVERTERS

These provide a range of speeds which can be varied, either by hand or automatically, according to the requirements of the machine. They include, *inter alia* :

- (1) **Gear-boxes** consisting of assemblies of gears which can be selected in alternative arrangements; the speed of transmission can thus be varied according to the arrangement of gears set.
- (2) **Friction disc or friction cone couplings and couplings with chains or driving belts**, in which a disc, a cone, a chain or a belt is in contact with a friction wheel whose position, relative to the centre of the disc or the ends of the cone, can be varied automatically (or as required), and so controls the speed of rotation transmitted.
- (3) **Variable speed fluid couplings, including hydraulic torque converters**. Variations are obtained by the rotation of vanes of the driving element in a fluid (generally oil) against fixed or movable vanes of the driven element. Power is transmitted either by pressure (hydrostatic changers) or by flux (hydrodynamic changers or torque converters).

The heading **does not cover** gear boxes or other variable speed changers combined with a motor; these are classified in the same heading as the motor.

(F) FLYWHEELS

These are relatively large, heavy wheels, usually constructed so that the weight is concentrated near the rim. The inertia of the wheel as it turns tends to resist any change in speed of the motor and so keeps the speed constant. Flywheels may in some cases have a grooved or cogged rim, or be fitted with connecting-rods, so that in certain circumstances they can act for the transmission of power (e.g., as a driving pulley or cog wheel).

(G) PULLEYS, INCLUDING PULLEY BLOCKS

Pulleys consist of wheels, sometimes with a grooved rim, which transmit rotary movement from one to another by means of an endless belt or rope revolving in contact between them. The heading covers simple pulleys, drums (wide pulleys), conical pulleys, stepped pulleys, etc.

The group also covers **pulley blocks** for hoists, etc., and free pulleys which do not transmit any power themselves but simply act as a guide or turning post for a transmission rope or cable (e.g., idlers and jockey wheels used to regulate the tension of driving belts).

An assembly of two or more pulley blocks (i.e., a hoist) is, however, **excluded** (heading 84.25).

(H) CLUTCHES

These are used to connect or disconnect the drive at will. They include :

Friction clutches in which rotating discs, rings, cones, etc. with friction surfaces, can be engaged or disengaged; dog (or claw) clutches in which the opposing members have projections and corresponding slots; automatic centrifugal clutches which engage or disengage according to the speed of rotation; compressed air clutches; hydraulic clutches; etc.

Electro-magnetic clutches, however, are **excluded** (heading 85.05).

(I) SHAFT COUPLINGS (INCLUDING UNIVERSAL JOINTS)

These include sleeve couplings, flange couplings, flexible couplings, hydraulic couplings, etc., and universal couplings (such as Cardan joints and Oldham couplings).

PARTS

Subject to the general provisions regarding the classification of parts (see the General Explanatory Note to Section XVI), the heading also covers parts of the goods covered by this heading.

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The heading also **excludes** :

- (a) Pieces roughly shaped by forging, of **heading 72.07**.
- (b) Transmission equipment of the kinds described above (gear boxes, transmission shafts, clutches, differentials, etc.), but which are designed for use solely or principally with vehicles or aircraft (**Section XVII**); it should, however, be noted that this exclusion does not apply to internal parts of vehicle or aircraft engines - these parts remain classified in this heading.

Thus a crank shaft or a cam shaft remains in this heading even if it is specialised for a motor car engine; but motor car transmission (propeller) shafts, gear boxes and differentials fall in **heading 87.08**.

It should further be noted that transmission equipment of the type described in this heading remains classified here even if it is specially designed for ships.

- (c) Parts of clocks or watches (**heading 91.14**).